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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/748,570	12/30/2003	Leonard Ciprian Mosescu	MSFT-2831 304071.01	8071
41505 7590 12/20/2007 WOODCOCK WASHBURN LLP (MICROSOFT CORPORATION) CIRA CENTRE, 12TH FLOOR 2929 ARCH STREET PHILADELPHIA, PA 19104-2891			EXAMINER AHLUWALIA, NAVNEET K	
			ART UNIT 2166	PAPER NUMBER
			MAIL DATE 12/20/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/748,570	<b>Applicant(s)</b> MOESCU, LEONARD CIPRIAN	
	<b>Examiner</b> Navneet K. Ahluwalia	<b>Art Unit</b> 2166	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10/05/2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 - 4, 6 - 16, 18 - 28 and 30 - 36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 - 4, 6 - 16, 18 - 28 and 30 - 36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. This communication is in response to the Amendment filed 10/05/2007.

#### ***Response to Arguments***

2. Claims 1 – 4, 6 – 16, 18 – 28 and 30 – 36 are pending in this Office Action. After a further search and a thorough examination of the present application, claims 1 – 4, 6 – 16, 18 – 28 and 30 – 36 remain rejected.
3. Applicant's arguments filed with respect to claims 1 – 4, 6 – 16, 18 – 28 and 30 – 36 have been fully considered but they are not persuasive.

*First, Applicant argues that there is no teaching in Bumbulis and Burges alone or in combination of the type specific mapping and the generation of the normalized column value by determining the column type.*

*In response to Applicant's argument, the Examiner submits that Bumbulis and Burges in combination teach type specific mapping and the generation of the normalized column value by determining the column type. The type specific mapping is disclosed Bumbulis throughout the reference as it teaches normalization which is a type specific mapping and according to the claim type specific mapping is disclosed only in the explanation of how the normalized column is generated, a few of the citations of such disclosure in Bumbulis are paragraphs 21, 67 – 69 and 239. These paragraphs also teach the generation of the normalized column.*

*Other claims recite the same subject matter and for the same reasons as cited above the rejection is maintained.*

Hence, Applicant's arguments do not distinguish the claimed invention over the prior art of record. In light of the foregoing arguments, the 103 rejections are sustained.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1 – 4, 6 – 16, 18 – 28 and 30 – 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peter Bumbulis ('Bumbulis' herein after) (US 2003/0204513 A1) further in view of Burges et al. ('Burges' herein after) (US 5,727,081).

With respect to claim 1,

Bumbulis discloses a system for index key normalization comprising a processor adapted for:

- (a) selecting a column of an index key (paragraph 15, Bumbulis);
- (b) generating a marker corresponding to the selected column (paragraph 70, Bumbulis);

- (c) generating a normalized column value corresponding to the selected column (paragraph 21, Bumbulis), wherein the processor generates the normalized column value by determining the type of the column value, and applying a type specific mapping function to the column value (paragraph 228, Bumbulis); and
- (d) appending the marker and the normalized column value pair to a previously generated marker and normalized column value pair if any (paragraph 86, Bumbulis).

Bumbulis however does not disclose the mapping function explicitly as disclosed.

Burges teaches the mapping function being used with the column values in column 13 lines 48 – 67 and column 14 lines 1 – 10, Burges.

It would have been obvious to one of ordinary skill in the art of data processing at the time of the present invention to combine the teachings of cited references because both the references cited work towards normalization and quick comparison of keys and compressed column 4 lines 48 – 61, Burges.

6. Claims 2 – 4, 6 – 8 have been rejected under the same rationale as claim 1. The references for the limitations are cited below.

With respect to claim 2,

Bumbulis as modified discloses the system of claim 1, wherein the processor repeats steps (a)-(d) for each column in the index key (paragraph 76 and figure 8A, 8B, Bumbulis).

With respect to claim 3,

Bumbulis as modified discloses the system of claim 1, wherein the processor, after generating the marker, determines if a column value is null, determines if a column value is of type bit, and determines if the column is sorted in ascending or descending order (paragraph 19 and 25, Bumbulis).

With respect to claim 4,

Bumbulis as modified discloses the system of claim 3, wherein the processor modifies the marker to indicate if the column value is null, is of type bit, and if the column is sorted in ascending or descending order (paragraph 227, Bumbulis).

With respect to claim 6,

Bumbulis as modified discloses the system of claim 1, wherein the processor compares the normalized column value to other normalized column values independent of the original column type (paragraph 69, Bumbulis).

With respect to claim 7,

Bumbulis as modified discloses the system of claim 1, wherein the processor standardizes the size of the marker and the normalized column value pair before appending the marker and the normalized column value pair to the previously generated marker and normalized column value pair if any (figure 6, 8A and 8B, Bumbulis).

With respect to claim 8,

Bumbulis as modified discloses the system of claim 7, wherein the processor standardizes the size of the marker and the normalized column value pair by comparing the marker and normalized column value pair to a predetermined maximum size and computing a checksum using the pair if the pair is greater than the predetermined maximum size; truncating the marker and normalized column value pair by removing bits from the end of the pair in excess of the predetermined maximum size; and replacing the end bytes of the truncated pair with the computed checksum (paragraphs 21 and 86, figure 6, Bumbulis).

With respect to claim 9,

Bumbulis discloses a system for index key column unnormalization of a normalized index key comprising a processor adapted for: determining if the type of a selected column value can be unnormalized; and if so, determining if the selected column was truncated; and generating the unnormalized column value if the selected column was not truncated (figures 8A and 8B, paragraphs 76 and 86, Bumbulis).

Bumbulis however does not disclose the unnormalized explicitly as disclosed.

Burges teaches the unnormalized values being considered column 11 lines 9 – 29 and column 12 lines 12 – 35, Burges.

It would have been obvious to one of ordinary skill in the art of data processing at the time of the present invention to combine the teachings of cited references because

both the references cited work towards normalization and quick comparison of keys and compressed column 4 lines 48 – 61, Burges.

7. Claims 10 – 12 have been rejected under the same rationale as claim 9. The references for the limitations are cited below.

With respect to claim 10,

Bumbulis as modified discloses the system of claim 9, wherein the processor moves through the normalized index key until the selected column is reached, by:

- (a) determining if the current column is a fixed size or variable size type (paragraph 21, Bumbulis); and
- (b) if the current column is a fixed size type, moving forward in the normalized index key a number of bytes equal to the size of the fixed size type, or if the current column is a variable size type, moving forward in the normalized index key a number of bytes equal to the length of the column, determined by examining each byte of the current column until the end of the column is reached (paragraph 227 – 228, Bumbulis).

With respect to claim 11,

Bumbulis as modified discloses the system of claim 10, wherein the processor repeats steps (a) and (b) for each column in the normalized index key until the selected column is reached (paragraph 76, Bumbulis).



With respect to claim 12,

Bumbulis as modified discloses the system of claim 9, wherein the processor determines if the selected column was truncated by determining if the selected column is a fixed size or variable size type; and, if the selected column is a fixed size type, determining if the size of the previous columns in the index key plus the size of the selected column is greater than a predetermined maximum size, or, if the selected column is a variable size type, examining each byte of the selected column until the end of the column is reached or the number of bytes examined plus the size of the previous columns in the index key exceed a predetermined maximum size (figure 6, paragraphs 21 and 86, Bumbulis).

With respect to claim 13,

Bumbulis discloses a computer-readable medium having stored thereon computer-executable instructions for performing a method for index key normalization comprising:

- (a) selecting a column of an index key (paragraph 15, Bumbulis);
- (b) generating a marker corresponding to the selected column (paragraph 70, Bumbulis);
- (c) generating a normalized column value corresponding to the selected column (paragraph 21, Bumbulis), wherein the processor generates the normalized

column value by determining the type of the column value, and applying a type specific mapping function to the column value (paragraph 228, Bumbulis); and (d) appending the marker and the normalized column value pair to a previously generated marker and normalized column value pair if any (paragraph 86, Bumbulis).

Bumbulis however does not disclose the mapping function explicitly as disclosed.

Burges teaches the mapping function being used with the column values in column 13 lines 48 – 67 and column 14 lines 1 – 10, Burges.

It would have been obvious to one of ordinary skill in the art of data processing at the time of the present invention to combine the teachings of cited references because both the references cited work towards normalization and quick comparison of keys and compressed column 4 lines 48 – 61, Burges.

8. Claims 14 – 16 , 18 – 20 have been rejected under the same rationale as claim 13. The references for the limitations are cited below.

With respect to claim 14,

Bumbulis as modified discloses the computer-readable medium of claim 13, further comprising computer-executable instructions for repeating steps (a)-(d) for each column in the index key (paragraph 76 and figure 8A, 8B, Bumbulis).

With respect to claim 15,

Bumbulis as modified discloses the computer-readable medium of claim 13, further comprising computer-executable instructions for, after generating the marker: determining if a column value is null; determining if a column value is of type bit; and determining if the column is sorted in ascending or descending order (paragraph 19 and 25, Bumbulis).

With respect to claim 16,

Bumbulis as modified discloses the computer-readable medium of claim 15, further comprising computer-executable instructions for modifying the marker to indicate if the column value is null, is of type bit, and if the column is sorted in ascending or descending order (paragraph 227, Bumbulis).

With respect to claim 18,

Bumbulis as modified discloses the computer-readable medium of claim 13, further comprising computer-executable instructions for comparing the normalized column value to other normalized column values independent of the original column type (paragraph 69, Bumbulis).

With respect to claim 19,

Bumbulis as modified discloses the computer-readable medium of claim 13, further comprising computer-executable instructions for standardizing the size of the marker and the normalized column value pair before appending the marker and the

normalized column value pair to the previously generated marker and normalized column value pair if any (figure 6, 8A and 8B, Bumbulis).

With respect to claim 20,

Bumbulis as modified discloses the computer-readable medium of claim 19, wherein standardizing the size of the marker and the normalized column value pair comprises: comparing the marker and normalized column value pair to a predetermined maximum size and computing a checksum using the pair if the pair is greater than the predetermined maximum size; truncating the marker and normalized column value pair by removing bits from the end of the pair in excess of the predetermined maximum size; and replacing the end bytes of the truncated pair with the computed checksum (paragraphs 21 and 86, figure 6, Bumbulis).

With respect to claim 21,

Bumbulis discloses a computer-readable medium having stored thereon computer-executable instructions for performing a method for index key column unnormalization of a normalized index key comprising: determining if the type of a selected column value can be unnormalized; and if so, determining if the selected column was truncated; and generating the unnormalized column value if the selected column was not truncated (figures 8A and 8B, paragraphs 76 and 86, Bumbulis).

Bumbulis however does not disclose the unnormalized explicitly as disclosed.

Burges teaches the unnormalized values being considered column 11 lines 9 – 29 and column 12 lines 12 – 35, Burges.

It would have been obvious to one of ordinary skill in the art of data processing at the time of the present invention to combine the teachings of cited references because both the references cited work towards normalization and quick comparison of keys and compressed column 4 lines 48 – 61, Burges.

9. Claims 22 – 24 have been rejected under the same rationale as claim 21. The references for the limitations are cited below.

With respect to claim 22,

Bumbulis as modified discloses the computer-readable medium of claim 21, further comprising computer-executable instructions for moving through the normalized index key until the selected column is reached, by:

- (a) determining if the current column is a fixed size or variable size type (paragraph 21, Bumbulis); and
- (b) if the current column is a fixed size type, moving forward in the normalized index key a number of bytes equal to the size of the fixed size type, or if the current column is a variable size type, moving forward in the normalized index key a number of bytes equal to the length of the column, determined by examining each byte of the current column until the end of the column is reached (paragraph 227 – 228, Bumbulis).

With respect to claim 23,

Bumbulis as modified discloses the computer-readable medium of claim 22, further comprising computer-executable instructions for repeating steps (a) and (b) for each column in the normalized index key until the selected column is reached (paragraph 76, Bumbulis).

With respect to claim 24,

Bumbulis as modified discloses the computer-readable medium of claim 21, wherein determining if the selected column was truncated comprises: determining if the selected column is a fixed size or variable size type; and if the selected column is a fixed size type, determining if the size of the previous columns in the index key plus the size of the selected column is greater than a predetermined maximum size, or, if the selected column is a variable size type, examining each byte of the selected column until the end of the column is reached or the number of bytes examined plus the size of the previous columns in the index key exceed a predetermined maximum size (figure 6, paragraphs 21 and 86, Bumbulis).

With respect to claim 25,

Bumbulis discloses a method for index key normalization comprising:

- (a) selecting a column of an index key (paragraph 15, Bumbulis);
- (b) generating a marker corresponding to the selected column (paragraph 70, Bumbulis);

- (c) generating a normalized column value corresponding to the selected column (paragraph 21, Bumbulis), wherein the processor generates the normalized column value by determining the type of the column value, and applying a type specific mapping function to the column value (paragraph 228, Bumbulis); and
- (d) appending the marker and the normalized column value pair to a previously generated marker and normalized column value pair if any (paragraph 86, Bumbulis).

Bumbulis however does not disclose the mapping function explicitly as disclosed.

Burges teaches the mapping function being used with the column values in column 13 lines 48 – 67 and column 14 lines 1 – 10, Burges.

It would have been obvious to one of ordinary skill in the art of data processing at the time of the present invention to combine the teachings of cited references because both the references cited work towards normalization and quick comparison of keys and compressed column 4 lines 48 – 61, Burges.

10. Claims 26 – 28, 30 – 32 have been rejected under the same rationale as claim 25. The references for the limitations are cited below.

With respect to claim 26,

Bumbulis as modified discloses the method of claim 25, further comprising repeating steps (a)-(d) for each column in the index key (paragraph 76 and figure 8A, 8B, Bumbulis).

With respect to claim 27,

Bumbulis as modified discloses the method of claim 25, further comprising, after generating the marker: determining if a column value is null; determining if a column value is of type bit; and determining if the column is sorted in ascending or descending order (paragraph 19 and 25, Bumbulis).

With respect to claim 28,

Bumbulis as modified discloses the method of claim 27, further comprising modifying the marker to indicate if the column value is null, is of type bit, and if the column is sorted in ascending or descending order (paragraph 227, Bumbulis).

With respect to claim 30,

Bumbulis as modified discloses the method of claim 25, further comprising comparing the normalized column value to other normalized column values independent of the original column type (paragraph 69, Bumbulis).

With respect to claim 31,

Bumbulis as modified discloses the method of claim 25, further comprising standardizing the size of the marker and the normalized column value pair before appending the marker and the normalized column value pair to the previously generated marker and normalized column value pair if any (figure 6, 8A and 8B, Bumbulis).



With respect to claim 32,

Bumbulis as modified discloses the method of claim 31, wherein standardizing the size of the marker and the normalized column value pair comprises: comparing the marker and normalized column value pair to a predetermined maximum size and computing a checksum using the pair if the pair is greater than the predetermined maximum size; truncating the marker and normalized column value pair by removing bits from the end of the pair in excess of the predetermined maximum size; and replacing the end bytes of the truncated pair with the computed checksum (paragraphs 21 and 86, figure 6, Bumbulis).

With respect to claim 33,

Bumbulis discloses a method for index key column unnormalization of a normalized index key comprising: determining if the type of a selected column value can be unnormalized; and if so, determining if the selected column was truncated; and generating the unnormalized column value if the selected column was not truncated (figures 8A and 8B, paragraphs 76 and 86, Bumbulis).

Bumbulis however does not disclose the unnormalized explicitly as disclosed.

Burges teaches the unnormalized values being considered column 11 lines 9 – 29 and column 12 lines 12 – 35, Burges.

It would have been obvious to one of ordinary skill in the art of data processing at the time of the present invention to combine the teachings of cited references because

both the references cited work towards normalization and quick comparison of keys and compressed column 4 lines 48 – 61, Burges.

11. Claims 34 – 36 have been rejected under the same rationale as claim 33. The references for the limitations are cited below.

With respect to claim 34,

Bumbulis as modified discloses the method of claim 33, further comprising moving through the normalized index key until the selected column is reached, by:

(a) determining if the current column is a fixed size or variable size type

(paragraph 21, Bumbulis); and

(b) if the current column is a fixed size type, moving forward in the normalized index key a number of bytes equal to the size of the fixed size type, or if the current column is a variable size type, moving forward in the normalized index key a number of bytes equal to the length of the column, determined by examining each byte of the current column until the end of the column is reached (paragraph 227 – 228, Bumbulis).

With respect to claim 35,

Bumbulis as modified discloses the method of claim 34, further comprising repeating steps (a) and (b) for each column in the normalized index key until the selected column is reached (paragraph 76, Bumbulis).

With respect to claim 36,

Bumbulis as modified discloses the method of claim 33, wherein determining if the selected column was truncated comprises: determining if the selected column is a fixed size or variable size type; and if the selected column is a fixed size type, determining if the size of the previous columns in the index key plus the size of the selected column is greater than a predetermined maximum size, or, if the selected column is a variable size type, examining each byte of the selected column until the end of the column is reached or the number of bytes examined plus the size of the previous columns in the index key exceed a predetermined maximum size (figure 6, paragraphs 21 and 86, Bumbulis).

***Conclusion***

12. THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

**Contact Information**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Navneet K. Ahluwalia whose telephone number is 571-272-5636.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alam T. Hosain can be reached on 571-272-3978. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
Navneet K. Ahluwalia  
Examiner  
Art Unit 2166

Dated: 12/17/2007

  
HOSAIN ALAM  
SUPERVISORY PATENT EXAMINER